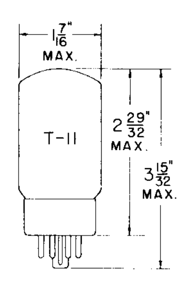
TUNG-SOL

BEAM PENTODE

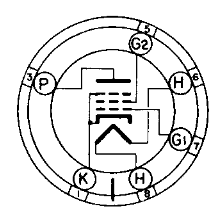


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 1.2 AMP.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHORT
SHELL 6 PIN OCTAL
LOW LOSS PHENOLIC

6BQ

THE 6098/6AR6WA IS A RUGGEDIZED SINGLE-ENDED BEAM PENTODE WHICH MAY BE USED IN APPLICATIONS REQUIRING RELATIVELY HIGH PEAK PLATE CURRENTS AT NEGATIVE GRID POTENTIALS. IT IS ELECTRICALLY EQUIVALENT TO THE 6AR6, BUT CONTROLS ON THE PRODUCT AVERAGE FOR SUCH CHARACTERISTICS AS PLATE CURRENT, SCREEN CURRENT, AND TRANSCONDUCTANCE ASSURE THAT THESE CRITICAL CHARACTERISTICS WILL REMAIN WELL CENTERED. SINCE IT MUST BE ABLE TO WITHSTAND SEVERE MECHANICAL TESTS TO MEET TEST SPECIFICATIONS, THE 6098/6AR6WA IS ESPECIALLY SUITED FOR USE IN INDUSTRIAL AND MILITARY AIRBORNE COMMUNICATIONS EQUIPMENT WHICH MAY BE SUBJECTED TO SEVERE SHOCK AND VIBRATIONS.

DIRECT INTERELECTRODE CAPACITANCES

	WITHOUT SHIELD	
GRID #1 TO PLATE (RATED)	0.55	μμf
MAXIMUM	9.9	μμf
MINUMUM	0.4	μμf
INPUT (RATED)	11.0	μμf
MAXIMUM	13.5	μμf
MINIMUM	8.5	μμf
OUTPUT (RATED)	7.0	μμf
MAXIMUM	9.2	μμf
MINIMUM	5.0	μμf

RATINGS

ABSOLUTE MAXIMUM VALUES

	CLASS A AMPLIFIER	CLASS B AMPLIFIER	
HEATER VOLTAGE	6.3±10%	6.3±10%	VOLTS
MAXIMUM DC PLATE VOLTAGE	400	600	VOLTS
MAXIMUM DC GRID #2 VOLTAGE	315	315	VOLTS
MAXIMUM DC GRID #1 CURRENT	0	---	mA
MAXIMUM PLATE DISSIPATION	21	21	WATTS
MAXIMUM GRID #2 DISSIPATION	3.5	3.5	WATTS
MAXIMUM HEATER-CATHODE VOLTAGE	±200	±200	VOLTS
MAXIMUM DC CATHODE CURRENT [A]	125	60	mA
MAXIMUM BULB TEMPERATURE	225	225	°C
MAXIMUM PEAK FORWARD PLATE VOLTAGE	---	1250	VOLTS

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TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS
CLASS A_1 AMPLIFIER

	TRIODE CONNECTION	PENTODE CONNECTION	
HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	1.2	1.2	AMP.
DC PLATE VOLTAGE	200	250	VOLTS
DC GRID #2 VOLTAGE	TIED TO PLATE	250	VOLTS
DC GRID #1 VOLTAGE	−12.5	−22.5	VOLTS
MAXIMUM GRID #1 CIRCUIT RESISTANCE	100 000	100 000	OHMS
DC PLATE CURRENT	90	77	mA
GRID #2 CURRENT	TIED TO PLATE	5	mA
PLATE RESISTANCE (APPROX.)	1 000	21 000	OHMS
DC GRID #1 VOLTAGE FOR PLATE CURRENT CUTOFF	---	−65	VOLTS
TRANSCONDUCTANCE	6 000	5400	μMHOS

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN
E_f = 6.3V, E_b = 250Vdc, E_{c2} = 250Vdc, E_{c1} = −22.5Vdc
EXCEPT AS MODIFIED BELOW

	INITIAL				500 HOUR LIFE TEST		
	INDIVIDUAL MIN.	INDIVIDUAL MAX.	PROD. MIN.	AVG. MAX.	INDIVIDUAL MIN.	INDIVIDUAL MAX.	
HEATER CURRENT	1.08	1.32	---	---	1.08	1.32	AMP.
HEATER CATHODE LEAKAGE (E_{hk}=±100Vdc)	---	75	---	---	---	75	μAdc
#1 GRID CURRENT	0	−1.0	---	---	0	−2.0	μAdc
PLATE CURRENT	55	100	68	86	---	---	mAdc
SCREEN GRID CURRENT	---	8.0	---	6.2	---	---	mAdc
GRID #1 TRANSCONDUCTANCE	4300	6500	4975	5825	4000	6500	μMHOS
INSULATION OF ELECTRODES[B] (E_f=6.3V, E(g1-all)=30Vdc, g1 neg; E(p-all)=500Vdc, p neg.							
R(g1-all)	25	---	---	---	10	---	MEGOHM
R(p-all)	25				10		MEGOHM
CUTOFF PLATE CURRENT (E_{c1} = 65Vdc)	---	1.0	---	---	---	---	mAdc
GRID #2 CURRENT[C] (Ef = 7.0V)	0	−3.0	---	---	---	---	μAdc
Δ TRANSCONDUCTANCE[D] (Ef = 5.7V)	---	15	---	---	---	15	PERCENT

SPECIAL REQUIREMENTS

	MIN.	MAX.	
VIBRATIONAL FATIGUE[E]	---	---	
SHOCK[F] (HAMMER ANGLE 30°, E_{hk}=100Vdc, HEATER POSITIVE, R_{g1} =0.1 MEG)	---	---	
POST SHOCK AND VIBRATIONAL FATIGUE TEST END POINTS			
VIBRATION	---	1500	mVac
HEATER CATHODE LEAKAGE	---	±150	μAdc
GRID #1 CURRENT	0	−2.0	μAdc
GRID #1 TRANSCONDUCTANCE	3500	---	μMHOS
HIGH VOLTAGE TEST[G] (E_{c1}=−150Vdc, E_{c2}=300Vdc, E_{bb}=1250Vdc, I_{c1}=0.2 mAdc, R_1=5000)	1150	---	VOLTS
AF NOISE[H] (E_{c1}=−35Vdc, R_p=2000, E_{cal}=245mVac)	---	17	VU
LOW FREQUENCY VIBRATION (E_{c1} = 35Vdc, R_p=2000)	---	1000	mVac

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SPECIAL REQUIREMENTS - CONT'D.

	MIN.	MAX.	
RIPPLE TEST[J] (E_b=325Vdc, E_{c2}=300Vdc, R_p=1000, R_k=500, E_f=6.3Vac, 400CYCLES)	---	100	mVac
LOW PRESSURE VOLTAGE BREAKDOWN [K] (VOLTAGE=800Vac, PRESSURE=55±5mm. Hg)	---	---	
STABILITY LIFE TEST (E_{hk}=200Vdc, HEATER POSITIVE, R_{g1}=47,000, MIN. BULB TEMP.=225°C) [L]			
STABILITY LIFE TEST END POINTS Δ GRID #1 TRANSCONDUCTANCE	---	10	PERCENT
100 HOUR SURVIVAL RATE LIFE TEST (INTERMITTENT LIFE TEST CONDITIONS OR EQUIVALENT)	---	---	
INTERMITTENT LIFE TEST (E_{hk}=200Vdc, HEATER POS., R_{g1}=47,000, MIN. BULB TEMP. =+225°C)	---	---	

NOTES

[A] DIFFICULTY MAY BE ENCOUNTERED IF THIS TUBE IS OPERATED FOR LONG PERIODS OF TIME WITH VERY SMALL VALUES OF CATHODE CURRENT.

[B] SEE MIL-E-1C 4.8.2

[C] PRIOR TO THIS TEST TUBES TO BE PREHEATED 5 MINUTES AT CONDITIONS INDICATED BELOW. TEST IMMEDIATELY AFTER PREHEATING. E_f=7.0Vac, E_{c1}=-22Vdc, R_k=0 OHMS, R_{g1}=0.1 MEG, E_b=250Vdc, E_{c2}=250 Vdc.

[D] THE VALUE OF #2 TRANSCONDUCTANCE SHALL APPLY TO INDIVIDUAL TUBES AND IS EXPRESSED:

$$\frac{(\text{SM AT } 6.3)-(\text{SM AT } 5.7)}{(\text{SM AT } 6.3)} \times 100$$

[E] SEE MIL-E-1C 4.9.20.6

[F] SEE MIL-E-1C 4.9.20.5

[G] THIS TEST WILL BE MADE BEFORE THE TRANSCONDUCTANCE #1 AND TRANSCONDUCTANCE #2 TEST. WITH A 60 CYCLE SINUSOIDAL DRIVING VOLTAGE APPLIED TO THE CONTROL GRID, MEASURE THE PEAK TO PEAK VOLTAGE ACROSS THE LOAD.

[H] SEE MIL-E-1C 4.10.3.2

[J] ADJUST E_{c1} SO THAT I_b=55 mAdc. MEASURE RIPPLE BETWEEN PLATE AND GROUND WITH METER HAVING AN IMPEDANCE OF 100,000 OHMS OR GREATER. THE HEATER SHALL BE TIED TO NEGATIVE END OF CATHODE RESISTOR.

[K] THERE SHALL BE NO EVIDENCE OF ARCING OR CORONA BETWEEN ANODE PIN AND ADJACENT PINS WITH NO OTHER VOLTAGES APPLIED.

[L] BULB TEMPERATURE SHALL BE DEFINED AS THE HIGHEST TEMPERATURE INDICATED WHEN USING A THERMOCOUPLE OF .003 INCH MAXIMUM DIAMETER ELEMENTS WELDED TO A RING OF .025 INCH DIAMETER PHOSPHOR BRONZE PLACED AROUND THE BULB.

6098/6AR6WA

PREMIUM TUBE

6098/6AR6WA

PENTODE CONNECTION

$E_f = 6.3$ Volts

$E_{c2} = 300$ Volts

$E_{c1} = 0$, −10, −20, −30, −40, −50, −60

PLATE MILLIAMPERES: 0, 100, 200, 300, 400

PLATE VOLTS: 0, 250, 500, 750, 1000, 1250

6098/6AR6WA

TRIODE CONNECTION

$E_f = 6.3$ Volts

$E_c = 0$, −10, −20, −30, −40, −50, −60, −70, −80, −90, −100, −110

PLATE MILLIAMPERES: 0, 50, 100, 150, 200, 250

PLATE VOLTS: 0, 100, 200, 300, 400, 500, 600